

Chemically-attached organic monolayers on silica nanoparticles as an NMR relaxation medium for embedded polynuclear aromatic hydrocarbons

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The ^1H NMR relaxation time that characterizes the development of observable nuclear magnetization in an NMR experiment, the spin-lattice or T_1 relaxation time, can be inconveniently long in many polynuclear aromatic hydrocarbons (PAH's) in the solid state, making the measurement of CP/MAS ^{13}C NMR spectra difficult or impractical. This situation contrasts strongly with T_1 relaxation in solution phase where molecular tumbling provides an efficient lattice relaxation pathway. In this contribution, we examine the interaction between PAH's and a thin film (monolayer) of hydrocarbon chemisorbed on a silica nanoparticle, with respect to relaxation dynamics between the organic moieties and the description of the motion of the PAH in this specialized environment.

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